

Advanced Photon Source

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APS Design Review Procedure

Changes made in this revision:

- Clarification that APS uses a graded approach and DDs may delegate project oversight responsibility.
- Changes to sections 1.2, 1.4.2, 1.4.4, 1.4.8, 2.2.1, and 2.5
- Added sections 2.3 and 2.4 (renumbered subsequent sections)
- Added Feedback and Improvement section (replaces link at end of procedure to APS Policies and Procedures Comment Form).

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APS Design Review Procedure

1 INTRODUCTION

APS design reviews assess the adequacy of new or modified designs of facility components and systems in terms of the potential impact they may have on the APS and its operations.

1.1 Purpose

This procedure defines a uniform approach for the APS to review designs.

1.2 Scope

This procedure applies to designs for new projects or modifications to existing APS systems, including mechanical, pressure, cryogenic, electrical, electronic, software, safety and shielding systems.

The same procedure will be applied designs brought to the APS from external parties, e.g., Partner Users. In this case the review will focus on safety, although recommendations regarding technical issues may be included in the report.

Consistent with Argonne LMS Quality Assurance Procedures, Chapter 1, section 1.5, APS management uses a graded approach to determine the appropriate level of formality to be applied to APS design reviews.

Any improvements or modifications to an APS safety system must follow a formal review process.

1.3 References

- [Argonne Laboratory Management System \(LMS\)](#)
- [APS Quality Assurance Program Plan \(APS_058185\)](#)
- [APS Conduct of Operations Manual \(APS_1180311\)](#)
- [BSDRSC Charter \(APS_1194904\)](#)
- [SCDR Charter \(APS_1198251\)](#)
- [RSSCDR Charter \(APS_1198246\)](#)

1.4 Definitions

1.4.1 Radiation Safety System (RSS) Component

For the purpose of this procedure a component or system used to provide radiation protection for personnel is considered a *Radiation Safety System (RSS) component*.

1.4.2 Division Director Design Review

A Division Director design review is an assessment of any new or modified designs of APS components or systems. Division Director design reviews ensure that designs will achieve project technical goals and meet all safety requirements. Consistent with a graded approach, a Division Director or Designee may charge, for example, a Steering Committee, an internal review panel, or an individual to organize or perform a Division Director design review with the appropriate level of formality.

1.4.3 Beamline – Front End Safety Design Review

A Beamline – Front End Safety Design Review is a design review of a beamline or front end system or component that is specifically for safety and not for technical quality. In this case, APS management has agreed to a standing steering committee, as noted in [section 1.4.4](#). For APS designed components, a Division Director Design Review will normally have taken place before the design is brought to a Beamline – Front End Safety Design Review.

1.4.4 Steering Committee

A Steering Committee is a committee charged by a Division Director to organize a design review. The steering committee appointed by the Division Director performs the review in accordance with the requirements of [section 2.5](#) and the specific charge. The technical content of the review is supported by the design package of drawings, specifications, calculations, and analyses.

In the case of Beamline – Front End Safety Design Reviews, APS management has agreed to a standing Beamline Safety Design Review Steering Committee (BSDRSC).

1.4.5 APS Safety Committee for Design Reviews (SCDR)

The SCDR evaluates the designs of new or modified facilities/components to help to ensure that designs meet APS and ANL standards for safety.

1.4.6 APS Radiation Safety Shielding Committee for Design Reviews (RSSCDR)

The RSSCDR evaluates the design of radiation shielding systems that are used for personnel protection for all aspects of radiation safety. The committee provides the APS and the APS User Community with technical advice on radiation safety and shielding issues.

1.4.7 Technical Design Review Panel (TDRP)

A TDRP is a panel of subject matter experts. APS has a number of TDRPs that are based on technical specialties, such as mechanical engineering and electrical engineering. Additional panel members, including experts external to the APS, may be recruited for specific design reviews as needed.

1.4.8 Project Coordinator

The project coordinator is the individual responsible for executing the project. This may be an engineer, physicist, MCR Chiefs of Operation, group leader, or associate division

director. In the case of a beamline safety design review, it is possible that the project coordinator may not be a member of the APS staff.

1.4.9 Integrated Content Management System (ICMS)

The APS on-line document/record management database.

2 RESPONSIBILITIES

The Division responsible for the review will ensure the submitted designs, reviews, and approvals are saved in ICMS.

Responsibilities concerning implementation of design reviews as defined in this procedure are as follows:

2.1 Associate Laboratory Director

The Associate Laboratory Director will:

- approve the design review procedure;
- provide the final approval of the design review process as described in the APS Quality Assurance Program Plan and the APS Conduct of Operations Manual;
- identify projects that require ALD design approval; and
- provide final decisions for projects identified as requiring ALD design approval.

2.2 Division Director

2.2.1 APS Division Directors

All APS Division Directors will:

- approve designs developed within their divisions, except as noted for beamlines, front ends, and projects identified as requiring ALD design approval;
- provide for oversight evaluations of the design review process.

Division Directors may:

- designate an Associate Division Director, a Group Leader, or an Individual to be responsible for oversight of projects or improvements of a one-time or continuing nature.

The Division Director or Designee will:

- assess the significance and the potential impact of new designs or engineering changes on the APS facility to determine the appropriate level of review, if any;
- identify a Project Coordinator for every project requiring a design review;
- ensure that the formality of the design review is appropriate for the project risk;

- assure that the design review process is properly conducted and documented in accordance with the APS Quality Assurance Program Plan and the APS Conduct of Operations Manual.

The Division Director or Designee may:

- charge an ad hoc steering committee, or a standing steering committee, to facilitate and coordinate formal design reviews, when needed;
- charge an internal review panel or an individual to perform the review in lieu of a steering committee if the design uses conventional technology and has a moderate or low potential consequence to APS operations;
- add individuals to a steering committee or internal review panel based on the potential impact of the design, the need for additional subject matter expertise, or in case of conflict of interest.

2.2.2 Additional Responsibilities of the AES Division Director

In addition to the above responsibilities, the AES Division Director will:

- be responsible for safety and facility operational issues associated with beamline designs by non-APS designers/engineers;
- provide safety oversight of beamlines, including RSS components for beamlines and front ends; and
- approve beamline and front end designs and modifications.

2.3 Associate Division Directors and Group Leaders

Associate Division Directors and Group Leaders are responsible for bringing to the attention of the Division Director any new or significantly expanded projects, in order to agree on the appropriate level of oversight.

2.4 Project Coordinator

The Project Coordinator will:

- ensure that ES&H and QA/QC requirements are addressed by the designs;
- assure that adequate documentation has been developed for the design review;
- submit the design review documents;
- coordinate the presentations to the APS design review panels and committees; and
- prepare a response to findings and recommendations from the design review panels.

2.5 Steering Committee

The Steering Committee charged with organizing the design review will:

- require a review by the RSSCDR for all RSS components;

- assure that all safety aspects of the project are reviewed;
- utilize the SCDR to assess safety issues;
- make use of standing APS Safety Committees and TDRPs to perform the reviews or, for limited scope reviews, carry out the review with participation limited to those steering committee members required for an adequate review;
- for Division Director design reviews, assure that technical designs meet project objectives;
- assure that the level of the review is commensurate with the complexity of the design;
- advise the Division Director of the need for additional subject matter expertise;
- combine the outcome of each TDRP and Safety Committee review and reconcile any differences.

The Steering Committee Chair will:

- provide an advisory report to the ALD, Division Directors, Associate Division Directors, and Group Leaders, as appropriate;
- express all concerns from reviews in the form of numbered recommendations, each beginning with an action verb (should the committee feel that further consideration of an issue is needed, “consider” is an appropriate action verb to use);
- specifically note in the report any review recommendations not adopted;
- ensure that Steering Committee reports are made available in the APS ICMS.

2.6 SCDR

The SCDR will:

- assess the safety aspects of designs in accordance with its charter;
- review the design, where possible, and in other cases solicit input from APS standing safety committees;
- identify issues that require further technical evaluation to the Steering Committee; and
- provide written reports in a timely manner.

2.7 RSSCDR

As part of its responsibilities to provide APS management and the APS User community with technically competent advice on the safety of radiation shielding systems at the APS, the RSSCDR will:

- evaluate all RSS components as required by steering committees and in accordance with its charter;
- submit written reports of these reviews, with any recommendations, to the requesting steering committee; and

- based upon its design evaluations, as appropriate, advise the Division Directors of recommended changes to existing safety envelopes.

2.8 TDRPs

TDRPs will:

- meet when requested by a steering committee;
- ensure the highest technical standards of new designs;
- promote best engineering values;
- ensure technological feasibility of the fabrication;
- ensure the customer input in the design; and
- provide a written report in a timely manner.

2.9 Design Staff

The Design Staff will:

- perform detailed design effort, including design modifications when required;
- provide all back-up material required to substantiate design and satisfy all design review scrutiny, as well as ESH and QA/QC requirements;
- participate in design reviews as required.

2.10 Division Quality Assurance Representative (QAR)

QARs participate in design reviews as follows:

- assure that acceptance criteria for quality verification are adequately specified in drawings and specifications;
- recommend improvements or corrections to quality verification criteria; and
- verify completion of agreed upon QA recommendations.

3 DESIGN REVIEW PROCEDURE

3.1 Overview

The design review procedure consists of a series of evaluations to determine the adequacy of a design in meeting its specified performance and operation.

3.2 Prerequisite Action

For APS design/engineering efforts covered by this procedure the responsible Division Director will assign a Project Coordinator. For non-APS managed beamline design/engineering efforts the beamline management will assign a Project Coordinator.

3.3 Design Review Procedure Flow

The design review procedure is shown in [Figure 1](#) as a hierarchically organized information flow from the Project Coordinator, through the Division Director to the review steering committee. The review process steps are:

| Step | | Task |
|------|-----------------------------|---|
| 1 | Project Coordinator | Submits request, along with the necessary design documentation, to the appropriate Division Director for review. |
| 2 | Division Director | 1. Evaluates the submission; 2. appoints the steering committee or internal review panel; and 3. charges the committee with the review. |
| 3 | Steering Committee | 1. Evaluates the submission; 2. arranges for Project Coordinator presentations, as required; 3. requests reviews by the appropriate safety committees and TDRPs; and 4. the Steering Committee Chair saves submitted design material in ICMS |
| 4 | Safety Committees and TDRPs | Review the designs and report to the Steering Committee. |
| 5 | Steering Committee Chair | 1. Integrates the input from the TDRPs and safety committees; 2. notifies the project coordinator if clarifications or additional information are required; 3. notifies in writing the project coordinator, the project coordinator's line management, and the requesting Division Director if, during the course of the review, the Steering Committee seeks prompt corrective action; 4. provides an advisory report to the requesting APS ALD, Division Directors, Associate Division Directors, and Group Leaders, as appropriate; and 5. saves the review/advisory report in ICMS. |
| 6 | Division Director | 1. Approves or rejects the design submission; 2. notifies the Project Coordinator of the decision; and 3. saves a copy of the approval in ICMS. |
| 7 | ALD | 1. Provides final approval for projects identified as requiring ALD design approval; 2. notifies the Division Director(s) of the decision; and 3. saves a copy of the approval in ICMS. |

3.4 Additional Requirements for Beamline – Front-End Safety Reviews

The external beamline Project Coordinator or APS Project Coordinator for an RSS component design submits the design package to the AES Division Director. The AES Division Director will utilize the BSDRSC to coordinate these reviews.

APS-designed front-end and beamline RSS components will normally have been the subject of a Division Director Review before they are presented to the BSDRSC. The report from the Division Director review will be made available to the BSDRSC.

RSS component designs that are different from existing approved designs or that will be used in a different context will be submitted at the conceptual level to the AES Division Director. The AES Division Director may choose to have the committee review the concept before further design work is done. In any case a final design review of RSS components will also take place prior to installation, unless such a requirement is waived in writing by the AES Division Director or designee.

4 DOCUMENTS/RECORDS CREATED BY THIS PROCEDURE

Design review documents, recommendations, and design changes resulting from the design review process will be kept in the APS ICMS.

| Description of Document/Record | Custodian | Storage Location and Medium | Retention Requirement |
|--------------------------------|--|-----------------------------|--|
| Submitted Designs | AES for beamline designs and the requesting division for other designs | ICMS | 5 years after design approval or until the equipment/facility is removed - which ever is later |
| Reviews & Approvals | AES for beamline designs and the requesting division for other designs | ICMS | 5 years after design approval or until the equipment/facility is removed - which ever is later |

5 FEEDBACK AND IMPROVEMENT

If you are using this procedure and have comments or suggested improvements for it, please go to the [APS Policies and Procedures Comment Form](#)^{*} to submit your input to a Procedure Administrator. If you are reviewing this procedure in workflow, your input should be entered in the comment box when you approve or reject the procedure.

^{*} http://www.aps.anl.gov/Internal/Policies_and_Procedures/comment_form.php

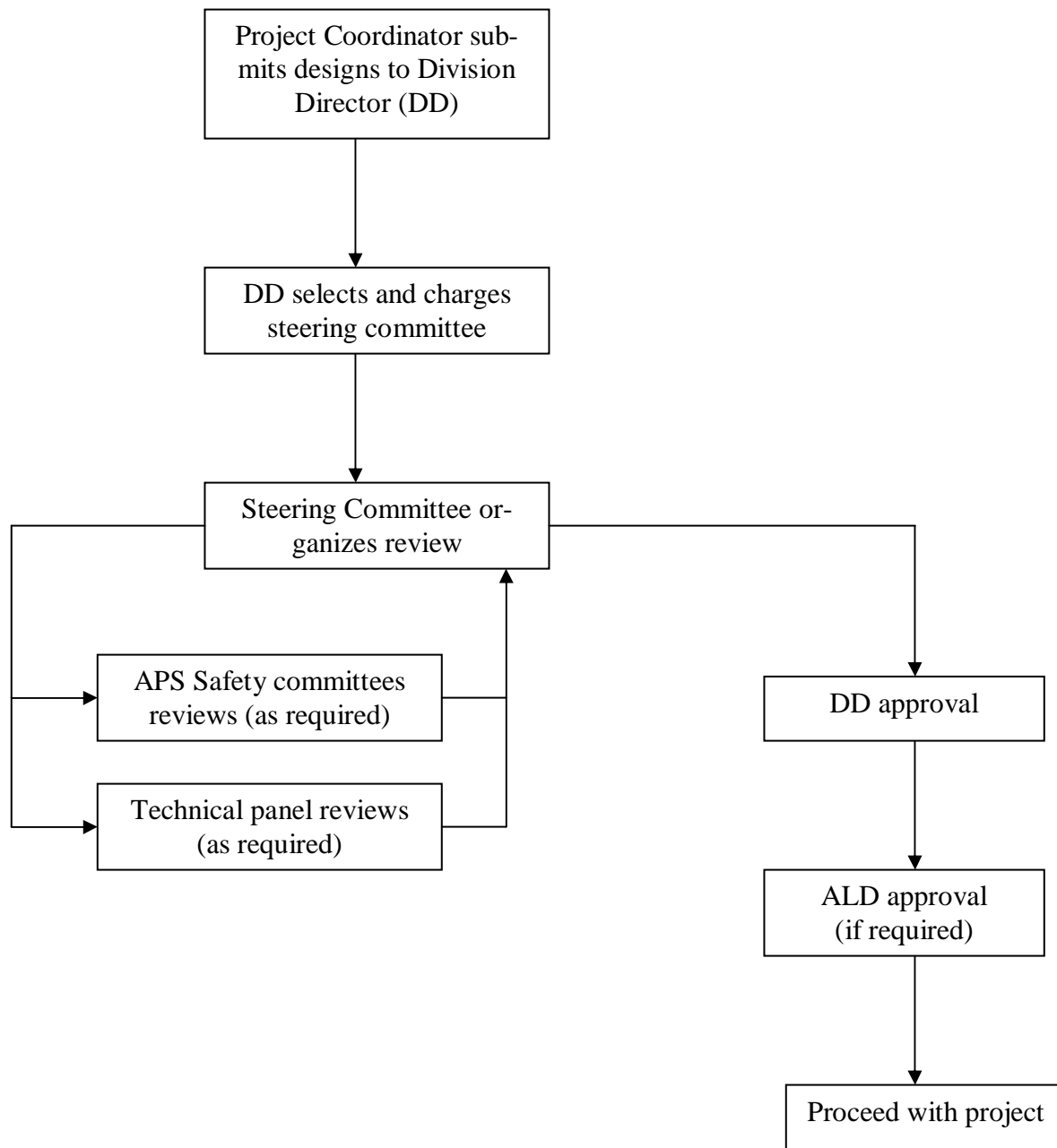


Figure 1. Design Review Procedure Flow